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MEMORANDUM FOR: Alan Greenspan, Director
Council of Economic
Advisers
Executive Office Building

The attached unclassified memorandum, "Western Europe and Japan: Substituting Coal for Oil," was prepared in response to your request last week. If we can be of any further help on this subject, please let us know.

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Acting Director
Economic Research

24 Jun 75
(DATE)

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Western Europe and Japan: Substituting Coal for Oil

Summary

Consumption by power generating plants is one of the few areas where government policy decisions by IEA countries could significantly cut the demand for OPEC oil in the 1980s. The following tabulation, which covers the consumption of oil in thermal generating plants in Western European countries and Japan, provides a crude numerical illustration of potential oil savings.

1.	Estimated consumption in 1975	3.4 mil b/d
2.	Estimated consumption in 1980 if oil must take care of increased demand for thermal-generated EP	5.5 mil b/d
3.	Estimated consumption in 1980 if, as OECD projects, high oil prices encourage some increase in coal consumption	4.6 mil b/d
4.	Estimated consumption in 1980 if strong OECD government support for coal production, consumption, and exports is added to the natural market forces	3.4 mil b/d

This tabulation is to be regarded only as a rough calculation since important assumptions had to be made about the consumption of electric power in 1980, the position of nuclear power in the energy mix, the role of natural gas, and the environmental policies in consuming countries. The potential for converting electric power plants in use this year is not great, on the order of 500,000 b/d in 2 years' time.

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24 June 1975

Trends in Coal Use by Utilities

Prior to the 1973 embargo, oil use in generating electricity grew rapidly while coal use declined. Coal consumption in Japan and Europe declined rapidly in the late 1960s and early 1970s primarily because of rising production costs and strong competition from oil. In six major European countries (West Germany, France, Italy, Netherlands, Belgium, and Luxembourg) oil use in generating plants more than doubled during 1968-1974, while coal use stagnated (Table I). Because industrial, commercial, and household use of coal plummeted during this period, overall coal consumption in these six countries fell by 30% from 3.7 million b/d to 2.7 million b/d (oil equivalent).

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Ability to Convert Power Plants to Coal

Over the next year or two, coal consumption by West European and Japanese electric power generating plants could be increased by the equivalent of 400,000 - 500,000 b/d (oil equivalent) if the coal was available and appropriate governmental orders were given. Most of this rise could come

about through conversion of plants with dual fuel capability to coal, reconversion of coal plants that had been converted to oil over the past decade, and the shifting of load factors and fuel mixes in plants that use a mixture of oil and coal. Conversion of this amount would require an increase in Free World steam coal production of about 40,000,000 tons.

Converting Plants with Dual Fuel Boilers

Conversion could be made relatively quickly in those cases where the plants were designed with a dual fuel capability or have been converted from coal to oil in recent years. In the late 1960s, some coal fired plants were converted to oil, largely because of environmental considerations.

In these cases, conversion to coal is relatively simple and inexpensive. The major cost factor and difficulty in making such conversions usually is a lack of coal handling facilities, which may have been removed when the plant was converted to oil. In addition, facilities to offload and transport coal might also be necessary to convert inland power generating plants that previously depended on domestic coal.

Germany and Japan have the greatest scope for shifting to coal over the next year or two. In Germany, in excess of 100,000 b/d of capacity could be shifted. Because of the sharp drop in coal usage since 1968 in France and the low countries, a like amount probably could be converted in other West European countries. [redacted] 25X6

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Conversion of Single Fuel Boiler Plants

Conversion of larger amounts of oil fired capacity would require substantially more time and investment. The bulk of the oil fired plants constructed over the past decade have been designed only for oil firing. In these cases, conversion without sizeable efficiency losses would require the installation of new boilers, as well as coal handling facilities. Depending upon the lay-out of each plant and the land available new boilers to accommodate coal might be installed without taking the plant out of service. Alternately -- in multiboiler plants -- the conversion could be carried out in stages to maintain most of the capacity on-line during conversion. In any event, conversion of these plants would require in excess of 2 years per plant, and conversion of a substantial number of plants would probably require a decade or more.

New Plants

Conversion of oil fired plants currently under construction or planned appears to offer the best long-term opportunity to boost coal fired capacity in Western Europe

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Government Policy in Western Europe and Japan

Governments in Western Europe and Japan are firmly committed to increasing the use of coal by power plants but are limited by available coal supplies. Because of the high costs involved, assured long-term supplies are necessary before conversion can take place on a significant scale. These governments already have taken steps to stem the decline in domestic coal output and are attempting to line up supplies of steam coal from the US, Australia, South Africa, Poland, and India.

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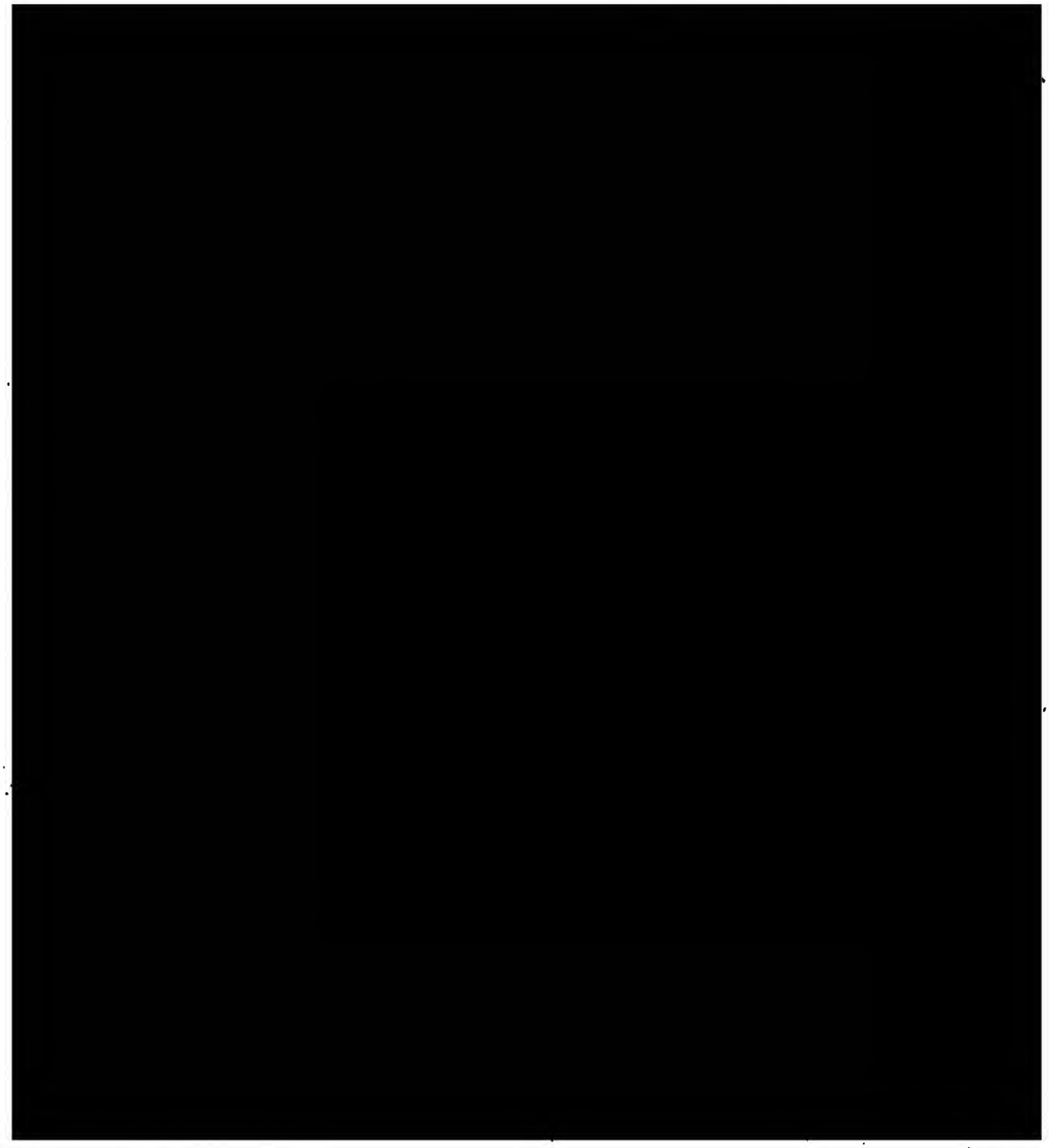

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Western Europe

West European countries are also committed to expanding coal consumption, but plans are generally less advanced than in Japan. Coal supply availability is a pressing

constraint. Domestic coal output is expected to level off, with little increase in output anticipated through 1980. Any major increase in coal consumption thus will come from supplies of imported steam coal.

Most major West European countries have made inquiries with US coal suppliers -- in an attempt to arrange large long-term contracts -- and have also been trying to increase their imports from Poland, South Africa, and Australia. Italian utility companies were instrumental in providing the financing for a 9 million ton coal export facility in South Africa. Germany and France also have reportedly signed contracts for South African steam coal.

Western Europe: Oil and Coal Consumption in Generating Electricity[1]

	Coal		Oil
	million tons coal	thousand b/d oil equivalent	thousand b/d
1966	62.4	840	370
1967	67.8	910	410
1968	71.0	950	450
1969	74.1	990	560
1970	68.1	910	690
1971	71.8	960	800
1972	69.0	920	920
1973	68.4	910	1060
1974 est	70.2	940	980

1. West Germany, France, Italy, Netherlands, Belgium, Luxembourg. In the remainder of Western Europe an estimated 700,000 b/d of oil are consumed by generating plants. Only in the UK does coal provide a major share of the fuel consumed.

Table II

Japan: Oil and Coal Consumption in Generating Electricity[1]

	Coal		Oil
	million tons coal	thousand b/d oil equivalent	thousand b/d
1966	23.4	310	250
1967	26.1	350	360
1968	26.0	350	430
1969	24.3	330	580
1970	18.8	250	720
1971	13.9	190	790
1972	10.7	140	970
1973	8.3	110	1150
1974 est	8.7	120	990

1. Public utility data only. Industrial power plants used an estimated 150,000 b/d of oil to generate electricity in 1974.